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RF System of Linear Accelerator for Natural Rubber Research

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The natural rubber research is ongoing project at the Plasma and Beam Physics Research Facility, Chiang Mai University, Thailand. The project aims to use electron beam irradiation for high quality vulcanization process for natural rubber. The main accelerator system consists of a DC thermionic electron gun, 5-cell linear accelerator structure, control system, RF system and electron beam irradiation system. This accelerator system aims to generate adjustable electron beam energy range from 0.5 to 4.0 MeV with pulse current of 10 –100 mA and pulse repetition rate of 20 –400 Hz. The 4 MeV electron beam with current of 100 mA produced at pulse repetition rate of 400Hz is expected to achieve the maximum absorbed dose of 640 Gy. The control system is designed and built in-house to fit the accelerator system requirement. The RF system consists of Pulse Forming Network (PFN), trigger board and thyratron switch, pulse transformer and pulse magnetron. This RF system can achieve RF power of 0.9 to 2.0 MW with pulse width of 4 μs. The pulse repetition rate can be varied from 20 to 400 Hz to control RF average power. The performance of control system and RF system as well as the results of RF commissioning will be present and discussed.

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